



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/988,686	12/11/97	KONECNI	A TI-22166

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MM11/0528

EXAMINER

EATON, K

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 05/28/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**08/988,686**

Applicant(s)  
**Konecni et al.**

Examiner  
**Kurt Eaton**

Group Art Unit  
**2814**



☒ Responsive to communication(s) filed on Mar 15, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) 16-20 is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-15 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☒ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election with traverse of the Invention of Group I (claims 1-15) in Paper No. 6 is acknowledged. There are no grounds for the traversal of the previously placed restriction requirement.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 16-20 are withdrawn from further consideration by the examiner as being drawn to a non-elected invention.

### ***Specification***

3. The disclosure is objected to because of the following informalities: lines of text in the disclosure are space too closely together; and holes are punched in the top of the disclosure.

Appropriate correction is required.

4. The claims are objected to because the lines are crowded too closely together, making reading and entry of amendments difficult. Substitute claims with lines one and one-half or double spaced on good quality paper are required. See 37 CFR 1.52(b).

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

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***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata et al..

US Patent #5,620,925 of Applicants cited Nakata et al. (herein referred to as Nakata) shows in Figures 4 and 5A-5F a method for interconnecting a conductive layer (37) and a contact region (33) of a semiconductor device by selectively coupling conductive material (36) made of aluminum to the contact region, including: negatively biasing the semiconductor device; bombarding residual material (30) made of aluminum oxide coupled to the contact region with inert (argon) ions in a chamber at a first position (11) associated with an integrated cluster tool; transferring the semiconductor device in situ (i.e. without being exposed to the ambient) from the first position to a chamber at a second position (21) associated with the integrated cluster tool; introducing hydrogen ions to the semiconductor device at the second position; selectively coupling the conductive material to the contact region at the second position using CVD to substantially fill a cavity associated with the contact region; and coupling the conductive layer to the conductive material by blanket deposition of the conductive material to interconnect the conductive layer to the contact region.

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Nakata also states that during inert gas ion bombardment, due to the impact of the inert gas ions, residual material on the surface of the contact region is physically ejected {column 4, line 19 - column 7, line 59; column 9, lines 24-40}.

It would have been inherent to one of ordinary skill in the art at the time the invention was made that bombardment of the residual material on the surface of the contact region of Nakata by the inert gas ions would have roughened the surface of the residual material, and thus would have increased the surface area of the residual material since not every particle of residual material would have been ejected at the same time and therefore a "roughened" surface with an increased surface area would have been created by the impacting inert gas ions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to expose the semiconductor substrate of Nakata to the hydrogen ions and the inert gas ions in the same chamber at the same time as opposed to exposing the semiconductor substrate to the hydrogen ions and the inert gas ions in separate chambers at separate times since accomplishing in one step what was accomplished in many steps would have been an obvious process optimization choice that would have involved routine skill in the art.


### *Conclusion*

8. Paper related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center located in the Crystal Plaza 4, room 4C23. The faxing of such papers must conform with the notice

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published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 308-7722 or -7724**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Kurt Eaton** at **(703) 305-0383** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by E-mail via **Kurt.Eaton@uspto.gov**.

  
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